

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

| | | | |
|--|---|---|-----------------------|
| Applicant's or agent's file reference 102 174 a/se | FOR FURTHER ACTION | | See Form PCT/IPEA/416 |
| International application No. PCT/EP2004/001434 | International filing date (<i>day/month/year</i>) 16.02.2004 | Priority date (<i>day/month/year</i>) 16.02.2004 | |
| International Patent Classification (IPC) or national classification and IPC INV. H04L29/06 | | | |
| Applicant TELEFONAKTIEBOLAGET LM ERICSSON (PUBL) et al | | | |
| <p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of 4 sheets, as follows:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. <p>b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> | | | |
| <p>4. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Box No. I Basis of the report <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application | | | |
| Date of submission of the demand 15.12.2005 | Date of completion of this report 18.04.2006 | | |
| Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | Authorized officer Mircescu, A Telephone No. +49 89 2399-7645 | | |



INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/001434

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
 - This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
 - international search (under Rules 12.3 and 23.1(b))
 - publication of the international application (under Rule 12.4)
 - international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

Description, Pages

| | |
|------|--|
| 1-18 | as originally filed |
| 4a | received on 15.12.2005 with letter of 15.12.2005 |

Claims, Numbers

| | |
|------------|--|
| 2-8, 10-16 | as originally filed |
| 1, 9 | received on 20.03.2006 with letter of 20.03.2006 |

Drawings, Sheets

| | |
|---------|---------------------|
| 1/7-7/7 | as originally filed |
|---------|---------------------|

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. The amendments have resulted in the cancellation of:
 - the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):
4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
 - the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|-------------------------------|------|--------|------|
| Novelty (N) | Yes: | Claims | 1-16 |
| | No: | Claims | |
| Inventive step (IS) | Yes: | Claims | 1-16 |
| | No: | Claims | |
| Industrial applicability (IA) | Yes: | Claims | 1-16 |
| | No: | Claims | |

2. Citations and explanations (Rule 70.7):

see separate sheet

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International application No.

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Following document is referenced:

D1: WO 03/047183 A (LEPISTOE MIKA ; KOSKIAHDE TIMO (FI); NOKIA CORP (FI)) 5 June 2003 (2003-06-05)

Citations and Explanations with Respect to Item V

1. The present invention is defined in claim 1 by a
 - (a)(1) data unit processing entity being part of a data unit transmission network,
 - (b)(1) the network comprising network nodes,
 - (b)(1)(α) the network nodes comprising routing nodes and end nodes,
 - (b)(1)(α)(i) one or more of the end nodes being mobile nodes,
 - (c)(1) the network nodes of (b)(1) being able to distinguish between a first type of network address (home address) which identifies network nodes
 - (c)(2) and a second type of network address (care-of address) which is used to perform routing to mobile nodes,
 - (d) the data unit processing entity of (a)(1) comprising a decision part for setting the second type routing address in a received data unit that is to be forwarded
 - (d)(1) depending on the first type routing address present in the received data unit
 - (d)(2) and depending on decision data stored in association with the first type routing address in a decision data memory,
 - (d)(2)(α) the decision data comprising one or more second type routing addresses,
 - (e) the data unit processing entity of (a)(1) further comprising a management part for the decision data memory of (d)(2),
 - (e)(1) the management part providing an interface to the decision data memory of (d)(2);
 - (f) such that the interface of (e)(1) is arranged to provide a network control function
 - (f)(1) which accesses the decision data memory of (d)(2) for modifying the decision data of (d)(2),
 - (f)(1)(α) the modification of (f)(1) being performed independently of access provided to one or more of the mobile nodes of (b)(1)(α)(i).

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The invention is further defined by a method (claim 9) which entirely corresponds to claim 1. Dependent claims 1-8 and 10-16 define additional features of claims 1 and 9, respectively.

2. The closest prior art which defines also the entire prior art in the present case is given by document D1 which discloses a method for routing in a wireless mobile network comprising mobile routers and mobile nodes, the mobile routers utilizing home and care-of addresses for the routing process. Each mobile router is arranged to provide access to the mobile nodes in order to set, and hence to control, which care-of address is used. (This care-of address control is achieved by sending binding updates from the mobile node to the home agent of the mobile node.) Contrary to the present invention, D1 does not allow to provide an interface in the mobile router to a further entity than the mobile node in order to access and control the care-of addresses independently of the mobile node.
3. The difference between the subject matter of claim 1 and the disclosure in D1 is given by the features (f)-(f)(1)(α). The novelty (Art 33(2) PCT) of the subject matter of claim 1 is then concluded a fortiori. The novelty (Art 33(2) PCT) of the subject matter of claim 9 is concluded by correspondence. The novelty (Art 33(2) PCT) of the subject matter of dependent claims 1-8 and 10-16 is concluded a fortiori.
4. The objective problem (g) to be solved by the present invention is
 - (g) the optimization of the method for performing routing in mobile networks with respect to mobility management at the level of the routing protocol.
5. Features (f)-(f)(1)(α) solve (g) since: (1) in cases where the mobile node connects to the network over a plurality of radio links, (2) it is possible for a network control element of a separate entity of the network (the data unit processing entity) to take into account aspects of radio link management, such as utilization, over-loading, congestion, (3) and to modify the selections with respect to the care-of address made by a user of a mobile node in order to optimize said link management aspects, (4) hence taking into account parameters and requirements of the overall network management, (5) hence significantly improving the method for performing routing in

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mobile networks with respect to mobility management in the entire network at the level of the routing protocol. This clearly shows that features (f)-(f)(1)(α) which allow the modification of the care-of address by a separate entity (the data unit processing entity) operating independently of the access provided to the mobile nodes, solve the objective problem (g).

6. Since (g) possess a plurality of possible solutions, and since there is no hint in the prior art (document D1) towards the solution given by the features (f)-(f)(1)(α), the solution consisting of (f)-(f)(1)(α) is not rendered obvious by D1. Therefore, the subject matter of claim 1 involves an inventive step (Art 33(3) PCT). The inventive step (Art 33(3) PCT) of claim 9 is concluded by correspondence. The inventive step (Art 33(3) PCT) of dependent claims 1-8 and 10-16 is concluded a fortiori.
7. The implementation of the technical apparatuses defined in claims 1-8 and the implementation of the technical processes defined in claims 9-16 requires resources for the processing, transmission, and storage of information. There are no requirements with respect to the performance of the resources for the processing, transmission, and storage of information, or with respect to the storage capacity of the resources for the storage of information.

Therefore, the technical apparatuses defined in claims 1-8 and the technical processes defined in claims 9-16 can be realised by commercially available resources for the processing, transmission and storage of information. Hence, the technical apparatuses defined in claims 1-8 and the technical processes defined in claims 9-16 are susceptible of industrial application (Art 33(4) PCT).

PCT/EP2004/001434
Telefonaktiebolaget LM Ericsson (publ)

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March 20, 2006

New Claims 1 and 9

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1. A data unit processing entity (4) in a data unit transmission network (10) comprising a plurality of network nodes (101-112), said network nodes (101-112) comprising routing nodes (101-109) and end nodes (110, 111, 112), said routing nodes (101-109) being arranged to route data units (20, 30) over said data unit transmission network (10) in accordance with a routing protocol (RP), one or more of said end nodes (110, 111, 112) being mobile nodes (110, 111) capable of accessing said data unit transmission network (10) over more than one link, said network nodes being arranged to distinguish between a first type routing address (IA) and a second type routing address (FA) in said data units (20, 30), said first type routing address (IA) serving to identify network nodes (101-112) and said second type routing address (FA) serving to allow routing to mobile nodes (110, 111),

said data unit processing entity (4) comprising a decision part (41) for setting the second type routing address (FA) in a received data unit (20, 30) that is to be forwarded, an operation of said decision part (41) depending on the first type routing address (IA) set in said received data unit (20, 30) that is to be forwarded and on decision data stored in association with said first type routing address (IA) in a decision data memory (42), said decision data comprising one or more second type routing addresses (FA),

35 said data unit processing entity (4) furthermore comprising a management part (43) for said decision data memory (42), where said management part (42) provides an

interface to said decision data memory (42) for modifying said decision data,

characterized in that

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said interface is arranged to provide a network control function (51) with access to said decision data memory (42) for modifying said decision data, independently of access provided to one or more mobile nodes (110, 111).

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9. A method of controlling a data unit processing entity (4) in a data unit transmission network (10) comprising a plurality of network nodes (101-112), said network nodes (101-112) comprising routing nodes (101-109) and end nodes (110, 111, 112), said routing nodes (101-109) being arranged to route data units (20, 30) over said data unit transmission network (10) in accordance with a routing protocol (RP), one or more of said end nodes (110, 111, 112) being mobile nodes (110, 111) capable of accessing said data unit transmission network (10) over more than one link, said network nodes being arranged to distinguish between a first type routing address (IA) and a second type routing address (FA) in said data units (20, 30), said first type routing address (IA) serving to identify network nodes (101-112) and said second type routing address (FA) serving to allow routing to mobile nodes (110, 111),

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said method comprising a decision procedure (S51-S53) for setting the second type routing address (FA) in a received data unit (20, 30) that is to be forwarded, said decision procedure depending on the first type routing address (IA) set in said received data unit (20, 30) that is to be forwarded and on decision data stored in association with said first type routing address (IA) in a decision data memory (42), said decision data

comprising one or more second type routing addresses
(FA),

5 said method furthermore comprising a management procedure (S61-S65; S71-S77) for said decision data memory (42), where said management procedure provides an interface to said decision data memory (42) for modifying said decision data,

10 characterized in that

15 said interface is arranged to provide a network control function (51) with access to said decision data memory (42) for modifying said decision data, independently of access provided to one or more mobile nodes (110, 111).

4a

WO03/047183 describes a system operating according to the mobile IPv6 architecture comprising a mobile node that has an associated home agent for conducting communication with a correspondent node over an IP network. This document is concerned with the problem that generic IP networks do not specifically support the selection of unidirectional links. The document proposes to provide detection of a unidirectional interface in the mobile node, and to then transmit to the home agent a binding update indicating a care-of address that identifies the detected unidirectional interface, such that packets can then be routed via the unidirectional interface.